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A PUNISHMENT-FREE, TOILET-TRAINING PROTOCOL FOR CHILDREN WITH DEVELOPMENTAL DISABILITIES

A Thesis

Presented to

The Graduate Faculty

Central Washington University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

Experimental Psychology,

Specialization in Applied Behavior Analysis

---

by

Chelsea Lynn Pearsall

August 2012

CENTRAL WASHINGTON UNIVERSITY

Graduate Studies

We hereby approve the thesis of

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Candidate for the degree of Master of Science

APPROVED FOR THE GRADUATE FACULTY

Aug. 1 2012 _____

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September 26, 2012 _____

Dean of Graduate Studies

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ABSTRACT

A PUNISHMENT-FREE TOILET-TRAINING PROTOCOL FOR CHILDREN WITH DEVELOPMENTAL DISABILITIES

by

Chelsea Lynn Pearsall

August 2012

The present investigation adapted a behaviorally-based toilet-training protocol for use with two male children with developmental disabilities. Positive practice and verbal reprimands were eliminated, and reinforcement, scheduled sits, and a urine alarm were utilized. Data were collected on the number of in-toilet urinations, urinary accidents, and self-initiations. Results show that both participants exhibited significant improvement in their toileting skills and met the final success criteria rapidly. These results were maintained through follow-up. Implications for the elimination of punishment procedures in future toilet training protocols are discussed.

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CHAPTER I

STATEMENT OF THE PROBLEM

Toileting skills are an important part of development, and caregivers frequently become concerned when an individual is delayed in this area (Chung, 2007). This is particularly true for children with developmental disabilities (DD). Individuals who acquire such skills have increased independence and lessen the burden on caregivers. For young school-aged children with DD, toileting skills are critical for facilitating inclusion into mainstream educational environments. Many educators focus on toileting as part of an educational goal and some even require it as a prerequisite for the educational environment (Keen, Brannigan, & Cuskelly, 2007). For older children and adults with DD, mastery of toileting skills reduces stigmatization, increases available living arrangements, and reduces the likelihood of poor personal hygiene, all of which increase an individual's quality of life (Cicero & Pfadt, 2002; Kroeger & Sorensen-Burnworth, 2009).

Appropriate urination skills include recognizing the sensation that accompanies having to urinate, refraining from elimination, seeking a toilet, taking off the necessary clothing, eliminating in the toilet, using toilet paper, dressing, flushing the toilet, and washing hands (Keen et al., 2007; Kroeger & Sorensen-Burnworth, 2009). The acquisition of proper urination skills often helps facilitate further acquisition of all toileting skills later; for example, these individual skills overlap to a great degree with the skills associated with appropriate defecation. Successful urination entails performing the above behavioral chain independently and without accidents (e.g., elimination in places

other than the toilet). Therefore, complex motor, communicative, and physiological skills are required, in addition to social awareness of an appropriate location to urinate (Radford & Anderson, 2003). Ambulatory motor skills are needed to get to the toilet, along with the necessary gross and fine motor movements needed to properly complete all the required steps. Communication skills are required to indicate the need to urinate and physiological development is needed in order to effectively feel the urge to urinate and associate that feeling with successful urination on the toilet (Radford & Anderson, 2003).

Many skills are involved in toileting, and specific behavioral methods have been developed to teach them. A large body of research has been conducted within the field of applied behavior analysis that revolves around the use of reinforcement and punishment-based contingencies to teach individuals with disabilities such skills as urinating in the toilet and self-initiating the use of the toilet (Kroeger & Sorensen-Burnworth, 2009).

Azrin and Foxx (1971) developed a highly successful method of toilet training that was very effective in teaching individuals with developmental disorders the skills necessary for continence. Their use of punishment procedures was well-known and widely accepted at the time they were developed. Since then, however, the field has experienced a change in the way punishment is viewed and has attempted to focus on reinforcement-based contingencies to teach new skills. More research is needed to determine the role punishment plays in eliciting successful treatment outcomes during toilet training.

The current study eliminated punishment-based contingencies used in a currently prevailing toilet-training protocol (Leblanc, Carr, Crossett, Bennett, & Detweiler, 2005) and evaluated the effectiveness of the research protocol that resulted. This evaluation of the effectiveness of toilet training without the use of punishment will further expand the current body of research regarding the most successful and socially valid way to toilet train individuals with disabilities. The review of the research literature that follows places this punishment-free approach in context.

CHAPTER II

LITERATURE REVIEW

For typically developing children, toileting usually occurs around the ages of 2 to 4 years old (Chung, 2007; Keen et al., 2007). For children with disabilities, these skills are acquired at a later age, if at all (Keen et al., 2007). In a study examining the bladder control of individuals with mental retardation, Chung (2007) found that while 62.9% of participants were successfully demonstrating bladder control by the age of 7 years, that number increased to 82.9% of participants by age 20. Tsai, Stewart, and August (1981) found similar findings with children with autism when results showed that only 41% of 3.5 year olds had achieved proper bladder and bowel control. In fact, Dalrymple and Ruble (1992) found that individuals with DD require an average of 1.6 additional years of training in order to properly exhibit toileting skills (Chung, 2007). These studies indicate that education on how to conduct toilet training with children with DD may reduce this additional timeframe. Parents and caregivers would likely benefit directly from explicit behavioral training on how to help their children acquire proper toileting (i.e., urination) skills. More importantly, the ability to teach toileting skills to their children also can have added benefits that may allow for earlier admission into mainstreamed educational environments.

Methods of Toilet-Training with DD Populations

Many methods exist for the training of in-toilet urination. Since toileting deficits are seen most often in individuals with developmental disabilities, the following review will focus on studies pertaining to participants with disabilities, specifically autism

spectrum disorders. In a review of the toilet-training literature, Kroeger and Sorensen-Burnworth (2009) indicate that behavioral methods used to toilet train consist of graduated guidance, reinforcement-based training, scheduled sittings, elimination schedules, punishment procedures, manipulation of stimulus control, priming, video modeling, and the manipulation of fluid intake. None of the 28 studies reviewed by Kroeger and Sorensen-Burnworth examined the effects of a single method stated above; rather, all of the studies used a combination of the techniques to produce effective outcomes.

Toilet-Training Techniques

Behavioral techniques for toilet training began in 1963 with Ellis (Kroeger & Sorensen-Burnworth, 2009). His behavioral approach focused on a stimulus-response method and was the first of its kind to use contingent positive reinforcement systematically in order to teach individuals with developmental disabilities toileting skills (Ellis, 1963). Shortly thereafter, Azrin and Foxx's (1971) rapid toilet-training (RTT) method was introduced and since then has became recognized as the most cited and behaviorally comprehensive toilet-training method (Kroeger & Sorensen-Burnworth, 2009). In the Azrin and Foxx (1971) study, nine adults with profound mental retardation were treated over a one-month period using a combination of elimination schedules, graduated guidance, hydration manipulation, punishment, positive reinforcement, scheduled sits, and a urine alarm. These methods have become standard intervention techniques used in training proper toileting (Kroeger & Sorenson-Burnworth, 2009).

Elimination Schedules

The elimination schedule technique addresses the need to schedule regular periodic timings for elimination based on a functional analysis of the participant's natural pattern of elimination. Azrin and Foxx did so by placing a mechanical device in the undergarments of participants that emitted a sound when moisture was sensed. This technique helps to determine times when the participant usually engages in elimination. The information allows researchers to schedule sits on an individual basis and thus to have a positive influence on behavior by increasing the probability of success (Azrin & Foxx, 1971; Kroeger & Sorensen-Burnworth, 2009).

Graduated Guidance

The graduated guidance technique typically involves a prompting method that uses either a backward- or forward-chaining method to teach the steps necessary for adequate toileting. In this method, a prompting hierarchy is constructed that ranges from the least to the most intrusive prompts (e.g., verbal prompts, physical prompting, physical guidance). For example, the first prompt may be the teacher saying "Go find the potty." If the child fails to move in the correct direction, the teacher will then physically encourage the child to stand up and move in the correct direction. If that fails, the teacher will physically walk the child to the toilet by holding her hand. The teacher may even provide additional directional support by placing her hand on the child's back to prompt forward movement. Once at the toilet, a new behavior begins, again with a verbal prompt "Pull down your pants." With every new behavior in the chain, the teacher begins with the least intrusive prompt. Progression up the hierarchy occurs only when the child fails to

respond to the prompt. The same procedure is used for each step in the chain (Kroeger & Sorensen-Burnworth, 2009), and prompts are faded as soon as possible (Cooper, Heron, & Heward, 2007). Graduated guidance serves to transfer stimulus control from physical prompts to naturally occurring stimuli so that participants learn to respond correctly to cues in their environment (Cooper et al., 2007).

Hydration Manipulation

Hydration manipulation simply involves encouraging study participants to drink moderate amounts of preferred liquids to increase the likelihood of more teachable and reinforceable moments/trials throughout the training. Leblanc et al. (2005) prompted their participants to drink every 5 minutes during the first hour, every 10 minutes during the second hour, every 15 minutes during the third hour, and every 30 minutes for the remainder of Day 1 training. They estimated that participants drank an average of 2 to 4 ounces of fluid per hour. Cicero and Pfadt (2002) reported a less strict hydration procedure and simply verbally encouraged the study participants to drink highly preferred liquids if their intake was "low." One must, of course, take caution as to not encourage excessive drinking that could result in participant harm (Kroeger & Sorensen-Burnworth, 2009; LeBlanc et al., 2005). Hydration schedules increase the likelihood of urination, therefore providing more opportunities for participants to be successful.

Scheduled Sitting

Unlike elimination schedules, scheduled sits consist of sitting the participant on the toilet according to a predetermined schedule and for a pre-specified amount of time. For young children, the scheduled sit may last up to 10 minutes, or until the child urinates

in the toilet. The participant is always reinforced for eliminating on the toilet during this time and is allowed to get off the toilet immediately after having done so. Intertrial intervals (ITIs) are the period of times spent off of the toilet. As a result, the length of the ITI varies with the length of the scheduled sit. When the scheduled sit decreases, the ITI increases. The inverse is also true. For example, during the first hour of day one training, the participant begins with an ITI of 5 minutes and a scheduled sit of 10 minutes. The ITI times subsequently increase every hour for the remainder of the day (described in greater detail in the method section). During the ITI, the child is encouraged to drink more liquids. After each ITI, a scheduled sit trial begins. This technique maximizes opportunities to eliminate and does not depend on the prerequisite skill of recognizing the sensation to eliminate, or on mastery of the steps it takes to achieve bladder control until the child locates a toilet. Scheduled sits also create repeated opportunities for reinforcement of appropriate behavior (Leblanc et al., 2005; Kroeger & Sorensen-Burnworth, 2009).

With the use of all of the above techniques, Azrin and Foxx (1971) found that every one of their nine participants developed the toilet-training skills necessary to toilet independently and appropriately. Since these results were published, many studies (for a review, see Kroeger & Sorensen-Burnworth, 2009) have utilized an adaptation of Azrin and Foxx's behavioral methods in the teaching of toileting skills.

Non-Behavioral Techniques

Other toilet-training methods include video modeling and urine alarms in addition to the use of behavioral contingencies.

Urine Alarms

Urine sensors that emit an alarm when wet are sometimes used as a part of treatment programs. In a review of the toilet-training literature, Kroeger and colleagues (2009) found that eight out of 28 toilet-training studies used urine alarms as a treatment component. Successful outcomes were seen in all of the eight studies with the exception of Lancioni (1980) and Mahoney, Van Wagenen, and Meyerson (1971). In both of these studies, all but one participant was toilet trained after intervention implementation (eight out of nine participants and seven out of eight participants, respectively). Alarms serve to notify researchers, parents, and caregivers that an accident has occurred. For the children, they also serve as a consequence—a negative one for some—for urinating outside of the toilet. Urine alarms commonly are available at drugstores or online. (See, for example, Amazon.com)

Video Modeling

Video modeling has been used in the toilet-training literature as a form of priming. Priming involves providing participants with information regarding a task before they are requested to engage in it independently. In this technique, participants are shown a video of successful steps leading to in-toilet urination prior to actually performing the task themselves. This essentially provides the participants with all of the information they need in order to perform the in-toilet urination, and thereby increases the likelihood of their success (Kroeger & Sorenson-Burnworth, 2009). Keen et al. (2007) examined the effectiveness of video modeling with five participants (aged 4 to 6 years old) diagnosed with autism. They compared a group of children receiving operant

procedures and video modeling to a group of children receiving operant procedures only. The authors utilized a multiple-baseline design across and between participants. Baseline measures indicated that none of the participants engaged in in-toilet urination during the 2-week period prior to treatment. Training took place 7 days/week by the participants' teachers, caregivers, and/or parents for 131 days. One group was shown a toilet-training video outlining the necessary toileting steps prior to each scheduled sit, in addition to receiving traditional toilet training using positive reinforcement for successful urination. The other group did not watch the instructional video, but received the same contingency-based toilet training. In keeping with ethical standards, the control group was eventually shown the video after participants in the treatment group successfully exhibited in-toilet urination. During the intervention, in-toilet urination increased sooner and with greater frequency with the video modeling/operant conditioning group, than the operant conditioning only group (Keen et al., 2007). These results indicate a positive effect when video modeling is used in conjunction with behavioral contingencies, but researchers must question whether or not it was beneficial when examining the rather long 131 days that it took participants to average three or four successful urinations.

Treatment Duration

Many researchers seek to provide the largest effect in the shortest amount of time. As such, treatment duration is an important consideration for gaining participant buy-in and satisfaction when recommending an intervention. Both treatment and training length vary greatly in the urination literature and have the ability to effect further use of the

protocols. For example, although the Keen et al. (2007) study demonstrated the effectiveness of video modeling procedures in conjunction with behavioral contingencies, there is a great deal of room for improvement with respect to treatment duration. In order to reach an acceptable level of behavior, the researchers continued treatment for 131 days. Some would argue that this is much too long and other methods have been shown to produce similar results in less time. For example, participants in the LeBlanc et al. (2005) study reached criterion in 30 days.

In an alteration of Azrin and Foxx's (1971) toilet-training protocol, Chung (2007) developed a protocol for a 12-year-old participant diagnosed with DD who had a history of failed toilet-training attempts. As opposed to Azrin and Foxx's (1971) method, Chung attempted to lessen the trainer burden by decreasing the number of hours typically spent toilet training from eight hours a day to three hours a day. Baseline measures indicated 100% urination in diaper and therefore, 0% urination on toilet. Success rates were determined based on the number of successful urinations on the toilet divided by the number of total bathroom visits. The results indicate that the participant learned to urinate on the toilet. His urinations in diaper decreased from 100% to only 5.8%. Throughout the entire study, he averaged 64% urinations in the toilet. Follow-up measures indicated that urination occurred an average of 79% of the time in the toilet with urination in diapers occurring an average of 56% of the time. These results do not add to a total of 100% because they were collected in different settings and then averaged. For example, the participant had 100% urinations in the toilet while at school,

but dropped drastically when at home. Subsequently, his urinations in diapers were low at school, and then increased rapidly at home. These conflicting findings across environments affected the overall average. Although elements of Azrin and Foxx's (1971) method were omitted, the protocol still seemed to be reasonably effective in reducing off-toilet urination and increasing successful urination on the toilet with the use of a shorter training time. However, the total study time needed to attain these results was 134 consecutive days, which included an approximately 2-week long winter break during which no training took place.

The Use of Punishment

In addition to the use of many non-aversive techniques such as graduated guidance, reinforcement-based training, elimination scheduling, video modeling, and the manipulation of fluid intake, various punishment techniques have also been implemented as part of toilet-training protocols. Restitutional overcorrection and positive practice have been successfully employed for over three decades.

Azrin and Foxx (1971) originally used a method of overcorrection, which LeBlanc et al. (2005) considered to be "restitutional." Overcorrection is generally defined as a tactic used to reduce problem behavior in which the learner is required to engage in behaviors that are logically related to the problem (Cooper et al., 2007). Azrin and Foxx required the participant to remove and wash his/her clothing, shower, and put on clean clothing, as well as clean up the toilet area following an accident. In this case, the punishment involved making corrections to the conditions (personal and environmental) resulting from the problem behavior such that the participant and the toilet area would be

in better condition relative to the period before the accident–hence the term "restitutional overcorrection."

Another form of punishment is called positive practice. The use of positive practice involves having the learner repeatedly perform the appropriate behavior (e.g., appropriate toileting behaviors), contingent upon the occurrence of a problem behavior (e.g., a urinary accident). Although positive practice can be seen as having educational value, it is still considered punishment if the repetition of the appropriate behavior is: a) aversive to the subject, 2) contingent on the occurrence of the problem behavior, and 3) results in a decrease in the problem behavior. Both restitutional overcorrection and positive practice are well suited to toilet-training protocols because urinary accidents present situations that can be repeated and corrected.

LeBlanc et al. (2005) developed an intensive training protocol involving positive reinforcement, scheduled sits, increased fluid intake, verbal reprimands, and positive practice. As in previous studies (Azrin & Foxx, 1971), positive reinforcement was assessed through the use of a preferred stimulus preference assessment and the preferred reinforcer was delivered contingent on performance of each requisite behavior appropriate to toileting (e.g., in-toilet urinations, initiations of urination, remaining on toilet for duration of scheduled sit). Positive practice was implemented every time the child urinated outside of the toilet. The positive practice procedure used by LeBlanc et al. consisted of an adaptation of Cicero and Pfadt's (2002) use of positive practice contingent upon off-toilet urination. Following a urinary accident, LeBlanc et al. required participants to repeatedly perform the entire sequence of behaviors for appropriate

toileting, e.g., walking to the toilet, pulling pants down, sitting on toilet, standing back up, pulling up pants. Participants were required to repeat the steps from the beginning four consecutive times in rapid succession. In this case, the punishment used by LeBlanc et al. was intended to serve as an element that decreased out-of-toilet urination by only requiring the necessary steps for appropriate toileting. No overcorrection was required. With the use of a multiple baseline across participants design, LeBlanc and colleagues measured self-initiations (e.g., communicative responses indicating the need to use the toilet), accidents (outside-toilet urination), and successes (inside-toilet urination) for three children diagnosed with autism. The results from this study indicate that the number of successes and self-initiations increased, while the number of accidents decreased compared to baseline.

Techniques such as overcorrection and positive practice can be aversive to young children, but it has been demonstrated that parents, staff, and the child clients themselves have rated positive practice as more acceptable than time-out procedures or medication (Kazdin, French, & Sherick, 1981). As such, the justification for the use of positive practice is well established (Kroeger & Sorensen-Burnworth, 2009). Further, although the effectiveness of punishment-based techniques in toilet training has been clearly demonstrated, the degree of aversiveness in all of these punishment-based interventions has not been addressed historically in the toilet-training research literature. All of this is changing as the field experiences a paradigm shift toward more positive behavioral

supports and away from punishment procedures for all treatment programs (see, for example, Kroeger & Sorensen-Burnworth, 2009).

Even so, overcorrection and positive practice continue to be used under a two-fold rationale: 1) All clients have the right to effective treatment (Van Houten et al., 1988), and 2) whereas various non-punishment based treatments may appear to better meet the requirements of the Least Restrictive Alternative law (Johnston & Sherman, 1993), the use of "less aversive" punishments such as overcorrection or positive practice provide more effective and significantly swifter outcomes (Kroeger & Sorensen-Burnworth, 2009). The result is often a choice between a protracted, reinforcement-based treatment with limited efficacy, and a faster, more effective but mildly punishing treatment. Parents often struggle with this choice because they may find their child's response to the punishment procedures difficult.

If a toilet-training protocol that relies primarily on positive reinforcement techniques can be shown to be effective and reasonably swift, the elimination of overt punishment contingencies such as overcorrection, positive practice, and verbal reprimands could reduce the aversiveness of the toilet-training process for both children and their parents. It may also increase parental willingness to continue treatment after training. However, it is not clear how many of the punishment-based contingencies are necessary to achieve the more rapid, successful outcomes. It is also not clear which of these techniques is responsible for their success.

The Current Study

The current study was designed to assess the efficacy of a toilet-training program that eliminated punishment procedures completely. In other words, the protocol proscribed the use of verbal reprimands, response blocking, overcorrection, and positive practice. Instead, it relied solely on reinforcement procedures. If the child got off the toilet, the researcher and/or parent(s) provided redirection and encouragement to get back on the toilet. This was done with verbal requests, offering of reinforcers on the toilet, and engaging or distracting the child. These redirection techniques were rarely necessary due to the enriching reinforcing environment that was created in the bathroom during scheduled sits. At all times, the child had access to reinforcers that serve as a distraction if they do not wish to sit on the toilet. If the child had an off-toilet accident, the parent and researcher did not provide a verbal reprimand. All punishment procedures were restricted.

The current procedure was an adaptation of a preliminary study by LeBlanc et al. (2005). Recall that LeBlanc and colleagues did not use overcorrection (e.g., cleaning the floor, cleaning themselves, or removing soiled clothes by themselves). Punishment was limited to positive practice and verbal reprimands (personal communication, Linda LeBlanc, December 8, 2011). Their results revealed that rapid toilet training could be accomplished without overcorrection. The current study replicated the LeBlanc et al. (2005) study while removing the positive practice and verbal reprimand contingencies. The focus is on the use of positive reinforcement combined with scheduled sits.

Research Question

Will a punishment-free toilet-training protocol developed for use with developmentally disabled children yield positive results in terms of mastery of the toileting procedures and time to criterion?

CHAPTER III

METHOD

The current study was reviewed and approved by the university's Human Subjects Research Committee prior to recruitment efforts.

Participants

The participants in this study were two male children with previously diagnosed developmental delays who were unable to initiate appropriate elimination of urine in the toilet. Prior unsuccessful toilet-training attempts did not exclude the individuals from participation. Both participants demonstrated independent and consistent use of at least two different mands (e.g., vocal language, American Sign Language (ASL), or Picture Exchange Communication System (PECS)). Individuals with no functional communication skills were excluded, because the toilet-training protocol utilized in this study requires that participants can communicate their need to eliminate using vocalizations, ASL, or PECS. Other exclusion criteria included: 1) a medical condition that would prohibit the individual from becoming toilet trained and the ability to initiate appropriate elimination in the toilet, or 2) past and/or present seizures. The toilet-training protocol that was employed during this study was not meant to toilet train individuals who were not physiologically capable of becoming urine continent. Information was gathered on each of these criteria during the preliminary screening questionnaire, and two participants were deemed fit for participation in the study.

Oscar[1] was 5-years old at the time of the study and had no known medical conditions. He was diagnosed with Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) in the year 2011. He was ambulatory and had communication via ASL, PECS, and spoken language. He possessed some toilet-training skills including pulling up and down his pants and sitting on the toilet independently. Previous toilet-training methods involved sitting Oscar on the toilet and using pull-ups. Each method was attempted without success. At the beginning of the study, Oscar was unable to recognize wet diapers/pants, urinate in the toilet, or initiate bathroom use. Oscar's mother participated in the toilet training. Oscar had two older male siblings and one father residing in the home.

Colin[2] was 4-years old at the time of the study and had no known medical conditions. He was diagnosed with autism in May of 2011. He was ambulatory and communicated primarily using ASL and spoken language. Colin did not have any toilet-training skills prior to the toilet training except for sitting on his potty chair independently. The parent reported previous toilet-training attempts including the use of pull-ups and taking him to sit on his potty chair. Both of these methods had little success. At the time of the training, Colin was not urinating on the toilet, requesting to use the toilet, or noticing wet pants/diapers. In addition, he could not pull up or down his pants independently. Colin's mother participated in the training. Colin had two older female sisters and one father residing in the home.

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[1] Oscar is a pseudonym.
[2] Colin is a pseudonym.

Recruitment

Participants were recruited via advertisements for toilet training (see Appendix A) in various locations throughout Washington State. Local professionals who had contact with the specified population also referred parents who were interested in toilet training to the primary investigator for potential participation in the study. Parents who were interested in receiving toilet-training services for their child were invited to contact the primary investigator by phone. During the initial phone contact, a brief description of the toilet-training protocol and the time commitment required for its implementation was discussed. If the parents agreed to the protocol and the time commitment, a time for a face-to-face informed consent meeting was identified. A preliminary screening questionnaire (see Appendix B) was then administered to the parents who agreed to be in the study and signed the informed consent form. The questionnaire assessed the potential participant's toilet-training history, current level of toileting skills, current level of functional communication skills, and any medical conditions that may prohibit the child from being toilet trained, including auditory sensory processing issues. An individual's eligibility to participate in this study was determined based on their parent's answers to the questions on the questionnaire and the inclusion and exclusion criteria listed above. Individuals who were excluded from the study, based on the exclusion criteria listed above, were referred to the Behavior Assessment Team at Children's Village in Yakima or the UW Autism Center or Seattle Children's Hospital Urology Clinic. Parents of individuals who were deemed ineligible based on the exclusion criteria had the option to

receive the Toilet-Training Packet for Parents that was used during the study (see Appendix C).

Informed Consent

After the parents agreed to participate over the phone, a face-to-face informed consent meeting was scheduled. During this meeting, the primary investigator discussed the protocol in more detail and obtained the parent's informed consent (see Appendix D). The primary investigator read the informed consent form to the parent, asked if the parent had any questions about the study, and obtained the parent's signature if the parent agreed to allow his or her child to participate. After the informed consent had been signed, the primary investigator provided the parent with instructions for collecting baseline data and a list of supplies that the parent should have on the first day of training. The primary investigator also scheduled a date for the first day of toilet training that was a minimum of three days from the date of the face-to-face meeting.

As the children in this study were not verbally sophisticated enough to understand the informed consent document, verbal assent was obtained from each boy prior to the first toilet-training session. In order to obtain assent, the toilet-training protocol was explained in developmentally appropriate language and the child was asked if he would like to participate. Because neither boy provided an answer, each one's parent was asked to monitor the participant's behavior for signs of assent or dissent while the protocol was being implemented and to notify the principal investigator should either occur. No such notifications occurred. The parents were consistently reminded that participation was

voluntary and that the protocol could be terminated at any point without penalty. At no time during either child's toilet-training sessions did the parents terminate the protocol.

Setting

The participants' toilet training occurred in all of their natural environments (i.e., home, school, day care, and church) to aid with the generalization and maintenance of toileting skills learned during the first few days of training. The first day of toilet training took place solely in the boys' home with the principal investigator serving as the primary trainer, and parents were advised that their child should stay at home as much as possible during the first 2 days of training. The children had complete freedom to move throughout the house or yard when not engaged in a scheduled sit. The boys were supervised at all times by either the parents or the investigator. After the initial, day-long toilet training, the remaining parent-supervised phases of the study were continued in each child's home, his school program, and other natural environments specific to each boy.

Materials

The materials required in order to implement the toilet-training protocol included a toilet or child's potty-chair, a sink, hand soap, a stepstool, a timer, a urine alarm, underwear, and a variety of the child's preferred toys, activities, beverages, and edibles. The toilet or child's potty chair was used to teach the participant where it was appropriate to eliminate. The parent was allowed to decide whether they would like to use the normal toilet or a potty chair for their child. One boy used a potty chair and the other used a regular toilet. The sink and hand soap was used to wash the boys' hands after each sit on

the toilet. This was done to teach them appropriate toileting hygiene from the beginning. The stepstool was utilized for the child who used a regular toilet and needed help getting on the toilet. A timer was used to signal when it was time to get on and off the toilet. A Wet-Stop3 Bedwetting System urine alarm was used to signal to the parent and investigator when the child was having an accident so that the child may be rushed to the bathroom. The primary investigator provided the step stool for the child who needed one and also provided timers and urine alarms. Underwear was used in place of diapers so that the boys would learn what it feels like to have an accident. A variety of the boys' preferred toys, activities, beverages, and edibles were used to motivate the participants to sit on the toilet and as rewards for appropriate elimination in the toilet. About twelve pairs of underwear were provided by each of the boys' parents, who also provided their children's preferred items.

Data Collection

Dependent Variables

Data were collected on three dependent variables: the number of accidents, the number of successes, and the number of self-initiations. An accident was defined as any urination off of the toilet or potty-chair. A success was defined as any urination on the toilet, even if it began as an accident. A self-initiation was defined as any attempt to communicate a need to urinate prior to beginning urination. Self-initiations may include a vocalization (e.g., "Potty"), a sign (e.g., signing "Potty"), the exchange of a PECS card, or going to the bathroom independently and urinating on the toilet. Parents were provided with data sheets on which to track the frequency of all three dependent variables.

Interobserver Agreement

Interobserver agreement (IOA) data were collected on the first day of toilet training. During the first day of toilet training both the primary investigator and the parent independently recorded data on the number of accidents, successes, and initiations. IOA was calculated using exact agreement. Exact agreement was calculated by dividing the lower observed frequency by the higher observed frequency, and multiplying by 100.

Treatment Integrity

Treatment integrity data were collected twice during the first day of toilet training. A second investigator completed a checklist during the morning of the first day of training in order to determine whether the primary investigator was implementing the protocol correctly (Appendix E). In addition, the primary investigator completed the checklist during the afternoon of the first day of training to assess whether the parent was implementing the protocol correctly.

Social Validity

Parents were asked to fill out a social validity questionnaire after they completed the study. The social validity questionnaire asked parents to rate the effectiveness of the protocol, the acceptability of the procedures employed by the protocol, and their happiness with the results of the protocol using a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5) (Appendix F). The questions for the social validity measure were taken from LeBlanc and colleagues' (2005) study to provide a basis of comparison.

Procedures

Baseline

At the intake interview, parents received instructions and materials to begin baseline data collection. Parents recorded on the data sheet the number of times their child successfully urinated in the toilet and the number of times they did so spontaneously. Parents were instructed to give no toilet-training instructions during baseline. Baseline data were collected for three and four days for Oscar and Colin, respectively. Each child urinated zero times in the toilet and had zero levels of self-initiation during three days of baseline data collection. The number of accidents was not recorded because neither of the parents agreed to take their child out of diapers prior to the intensive training day. Until the first day of training, neither boy had previous experience with wearing underwear.

Toilet-Training

The intervention consisted of three major components: the parent training packet, the all day (in-home) toilet-training intervention with the primary investigator, and the parental oversight component in which the parents continued the treatment contingencies established during the all day intervention. The parent-training packet (Appendix C) contained a detailed outline of the toilet-training protocol and accompanying instructions for the parents in order to continue implementing the toileting protocol once the primary investigator left their home. Additionally, it included contact information, a preparation checklist, an easy to read list of scheduled sit times, criteria for changing the scheduled

sits and removing the urine alarm, a letter to the child's daycare/school staff members informing them about the toileting protocol, and a list of reminders.

On the scheduled training day, the trainer arrived at the family home at 9 a.m. or 10 a.m., dependent on parent preference. The trainer checked to make sure the bathroom environment was clean and that reinforcers were readily available. Training focused on the use of the toilet for Oscar and the use of a potty chair for Colin. This difference in apparatuses was based on parent preferences. The boys were encouraged to drink liquids between schedule sits. Table 1 presents the schedule for offering drinks between scheduled sits.

Table 1

Schedule for Offering Drinks on Day One (after LeBlanc et al., 2005).

When offered	Drink offering frequency
First hour	Every five minutes
Second hour	Every 10 minutes
Third hour	Every fifteen minutes
Rest of the day	Every 30 minutes

After 5 minutes, the child was taken to the bathroom, a urine alarm was placed in their underwear and the first scheduled sit began. During scheduled sits times, the trainer and/or parent urged the child to get on the potty. Oscar required assistance when getting up on the toilet, but Colin did not need help to use his potty chair. Oscar was assisted or guided by the primary investigator and/or his parent. Both boys attempted to get off of

the toilet/potty chair and were redirected and encouraged to get right back on. This only occurred in the beginning of the scheduled sits for both children. Scheduled sitting times began when the child was appropriately seated (see Table 2); a timer was set for the scheduled time. Scheduled sit times did not start over when the child got off and required redirection back onto the toilet/potty chair.

Table 2

Levels of Scheduled Sits (after LeBlanc et al., 2005).

Level	Minutes on and off toilet
Level 1	10 minutes on, 5 minutes off
Level 2	10 minutes on, 10 minutes off
Level 3	5 minutes on, 15 minutes off
Level 4	5 minutes on, 25 minutes off
Level 5	5 minutes on, 35 minutes off
Level 6	5 minutes on, 45 minutes off
Level 7	5 minutes on, 1 hour off
Level 8	5 minutes on, 1.5 hours off
Level 9	5 minutes on, 2 hours off
Level 10	5 minutes on, 2.5 hours off
Level 11	5 minutes on, 3 hours off
Level 12	5 minutes on, 4 hours off

Participants remained at each level for one hour the first day, and then increased by one level every half-day (for Days 2 and 3) based on the individual child's normal sleep schedule. Beginning with Day 4, the training consisted of increasing the level every 48 hours until the sitting schedule was terminated. When level 12 was reached, it was continued until criteria for success were reached (see below). Data collection continued until the final criteria for success were reached, or until the child had been in treatment for 30 days. Neither boy needed the full 30 days to reach success criteria.

Daily Procedures

Throughout Day 1, the boys were offered many beverage opportunities to increase their fluid intake and increase the likelihood of urination in the toilet. Additionally, parents were present in order to learn the appropriate toileting protocol. Parent training on Day 1 was necessary so that they were able to properly implement the protocol independently on subsequent days. All successful urinations on the toilet were reinforced with verbal praise and with tangible or edible reinforcers (toys or food) identified by the parents. All time intervals (off- and on-toilet time) were recorded using a stopwatch. Once the timer sounded, signaling the end of the off-toilet interval, a verbal response (e.g., "Potty") was used as a verbal prompt before leading the child to the toilet. Until the urine alarm criterion, described in the next section, was reached, participants wore the alarm in their underwear to detect wetness. The urine alarm was, however, removed during naps and at night during which time a diaper was put on. When the alarm sounded, this signaled that the child had an accident and he was immediately rushed to the toilet and the next scheduled sit duration was implemented. The child then had his pants

changed and the cleaned alarm placed back in his underwear. Parents were instructed not to use punishment-based contingencies (e.g., cleaning up the mess, reprimands, etc.) after an accident.

Data were collected throughout Day 1 by the primary investigator and parents and the following days by the parents, caregivers, or school staff. The researcher was available via phone for any questions or concerns following the end of Day 1.

Criteria for Successful Toilet Training

Parents were instructed to continue the toilet-training program with scheduled sits until the child had reached the final criteria for success. For the present study, final success was defined as two consecutive days at Level 12 with no urine alarm and with 80% in-toilet urinations.

The urine alarm could have been eliminated in one of two ways: 1) after two days of 100% success (in-toilet urinations) with at least one self initiation, or 2) after the child self initiates the toileting process 40% of the time over a 2-day period with no more than 20% off toilet accidents. Achievement of criterion one for urine alarm removal was preferred. Criterion two was considered acceptable for urine alarm removal only if two weeks had elapsed without the participant meeting the goals for criterion one. Once the urine alarm was removed, the child had to reach level 12 for scheduled sits and complete two consecutive days of 80% in-toilet urinations without the urine alarm. The use of the urine alarm was not to be reinstated after it had been removed.

Experimental Design

Baseline Logic

The analytical logic that underlies single-subject, baseline-treatment interventions requires the collection of behavioral data under the existing conditions prior to treatment. These data provide insight into: 1) the frequency and rate of the target behavior, 2) the stimulus conditions (antecedents) under which the behavior does or does not occur, 3) the consequences of the target behavior or of alternative competing behaviors, 4) an appropriate criterion for reinforcement in order to encourage behavior change, and 5) correct measurement that is objective and free from subjective opinion. Once treatment is implemented (often a manipulation of behavioral antecedent and/or consequences), data are again gathered on the rate or frequency of the target behavior. The scientific logic of the baseline-treatment design is as follows: If the treatment has no effect on the target response, the behavior should not change in frequency. No change would support the null hypothesis. If, on the other hand, the frequency or rate of the target behavior changes substantially in some combination of level, trend, or variability, the null hypothesis can be rejected. Replications of the same behavioral effect across different subjects in a staggered fashion provide evidence of treatment generality. In other words, baseline logic utilizes affirmation, prediction, verification, and replication combined with stable responding to examine treatment outcomes empirically (Cooper et al., 2007). For a detailed explanation see Cooper et al. (2007).

Design

A nonconcurrent multiple baseline across participants design was used to evaluate the effectiveness of the toilet-training protocol (see Figure 1). Multiple baseline designs are the most widely used experimental designs in applied behavior analysis in general, and the toilet-training literature specifically (Cooper et al., 2007). The nonconcurrent multiple baseline across participants design incorporates an initial baseline data collection period in which no intervention is present. Baseline is followed by the implementation of the proposed treatment. Unlike the traditional multiple baseline design that utilizes simultaneous baseline onset across participants combined with staggered *treatment* onsets, the nonconcurrent multiple baseline design is characterized by the staggering of both baseline and treatment onsets. In some cases, the onset of the second baseline (for the subsequent subject, setting, or behavior) may follow completion of the treatment phase by several days or weeks. For the current study, data collection began as each participant was enrolled in the study. This resulted in a nonconcurrent multiple baseline across participants design because the primary investigator was unable to schedule two participants simultaneously.

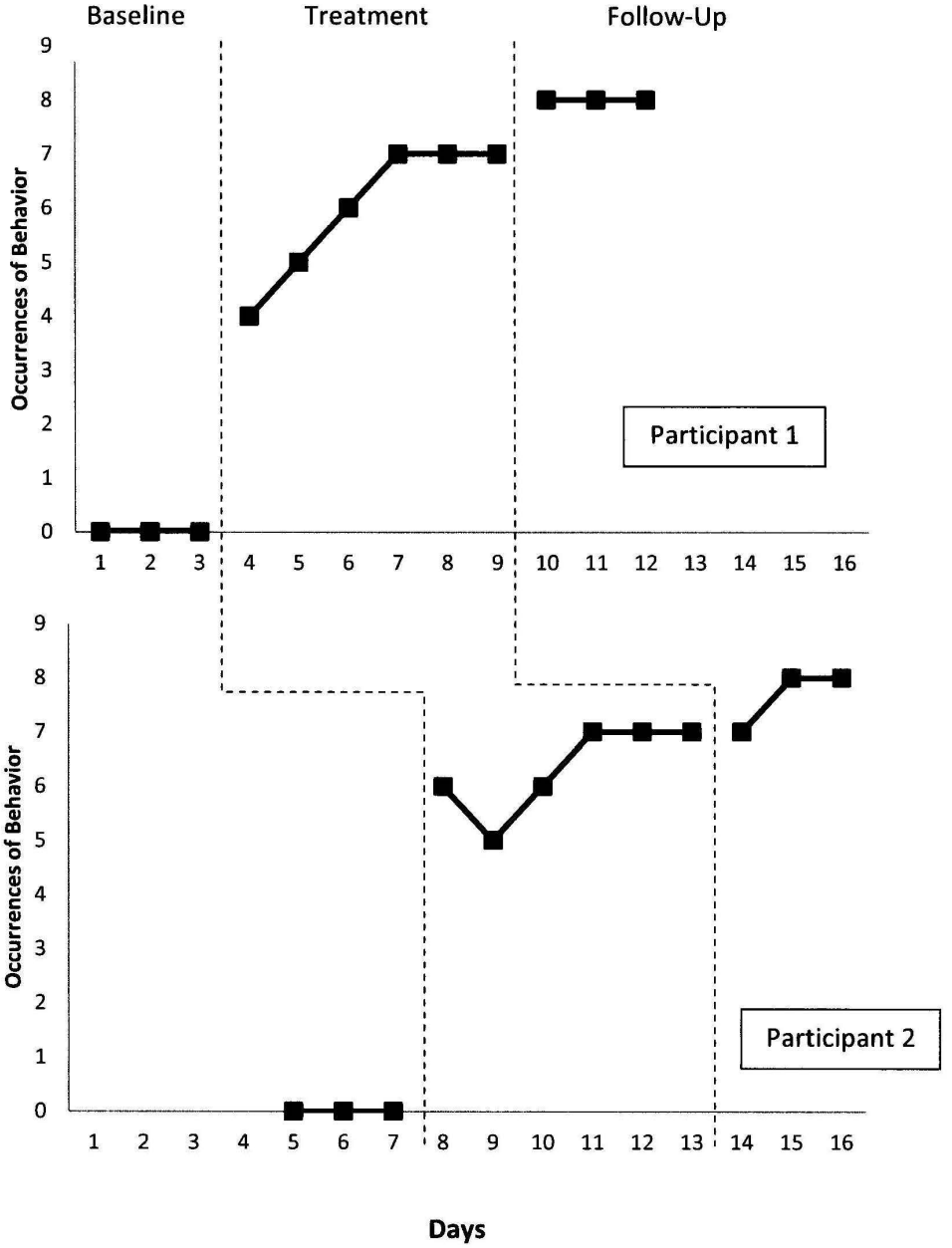

Figure 1. Example of a nonconcurrent multiple baseline across participants design.

CHAPTER IV

RESULTS

Analyses

The analytical methods for the current study were based on visual inspection for stability, variability, level, and trend for each dependent measure within and between the baseline and treatment conditions for each participant. For a comprehensive review of visual inspection techniques, see Cooper et al. (2007). Comparisons consist primarily of the identification of qualitative differences across conditions for each individual child. Between participation analyses were used to provide evidence of generalizability.

It is important to note that every paper cited in this review of the literature has conducted data analyses through standard visual inspection techniques. Because this study aimed to further knowledge in the area of behavioral toilet training, it was important to analyze data in ways that were similar to previous methods. Visual analyses of graphically displayed behavior data provide a systematic approach to the interpretation of variability and trends. Visual analyses allow researchers to determine whether behavior changes in meaningful ways, and seeks to determine if that change was due to the treatment. This technique can be done in two different ways: 1) through the use of visual inspection within conditions, and 2) through the use of visual inspection between conditions. When visually inspecting data within a condition, researchers assess the variability, level, and trends in the data set. The number of data points must be considered in order to confidently estimate the data's path. Variability was determined by visually identifying the number and degree of deviations from the stable data path. High

variability often indicates that researchers have exerted little control over the behavior, whereas low variability indicates a higher level of control. Level in graphical data is determined through the use of a mean, median, or mode. Trend was used to assess the degree in which the behavior was increasing, decreasing, or remaining level and stable. After visual inspection within conditions was performed, visual analyses between conditions were conducted. During this analysis, visual inspection was performed in much the same way as within conditions, but now, level, variability, and trend were examined by comparing these measures across conditions. Attention shifted to comparing data points in the baseline condition to data points in the intervention condition. The greater the change in level and/or trend between these two conditions for each participant, the more confident researchers can be in determining the independent variable as the cause of change (Cooper et al., 2007).

Methodological Assurances

Interobserver Agreement

IOA between the primary investigator and each boy's parent for the three dependent variables (in-toilet urination, accidents, and self-initiations) was assessed for all incidents. Obtained IOA was 100% for each dependent variable during the first day of training.

Treatment Fidelity

Treatment fidelity data were taken only on the first day of intensive toilet training. A secondary investigator took the data on the primary investigator and the primary investigator took the data on the parent. Appropriate use of the protocol by both the

primary investigator and each parent were examined. The primary investigator implemented all procedural steps correctly throughout both children's training sessions 100% of the time. During Oscar's training, treatment integrity with the primary investigator was assessed for 100% of his toileting incidences. During Colin's training, treatment integrity with the primary investigator was assessed for 58.3% of his toileting incidences. During the afternoon of the first day of training, the primary investigator completed the form based on the parents' implementation of the protocol. Parent 1 implemented all steps correctly 87.5% of the time while Parent 2 implemented all procedural steps correctly 90.7% of the time. Treatment integrity with both parents was assessed for 33% of their child's toilet-training incidences. Both parents missed opportunities for beginning the stopwatch after a scheduled sit. This was the main area of concern and reason for decrease in treatment integrity. The primary investigator addressed this issue in the protocol implementation with each parent prior to leaving on the first day. The primary investigator did not leave until each parent was performing the protocol implementation correctly.

Social Validity

Individual results of the social validity questionnaire (Appendix F) are presented in Table 3. Note that item number 6 was numerically reversed to align it with a positive/negative social validity assessment measure. Oscar's mother gave the most positive rating on all questions. Colin's mother rated *strongly agree* (the most positive option on the form) for eight out of the nine questions. The remaining questioned stated, "I believe my child experienced discomfort during the treatment" and was rated as *agree*.

Interestingly enough, although this parent felt that her child experienced discomfort, she still rated *strongly agree* on questions 1, 2, 3, 4, and 8 which all had questions regarding the use of this protocol with others, the use of this protocol again, and the use of this protocol with those who cannot choose treatment options for themselves.

Table 3

Results of the Social Validity Questionnaire

Question	Oscar's mom	Colin's mom
1) I find this treatment to be an acceptable way of dealing with my child's toilet training.	5	5
2) If I were to do this over, I would still be willing to use this procedure to toilet train my child.	5	5
3) I believe that it would be acceptable to use this treatment with other children.	5	5
4) I like the procedures used to toilet train my child.	5	5
5) I believe this treatment was effective.	5	5
6) I believe my child experienced discomfort during the treatment.	5	2
7) I believe this treatment is likely to result in permanent improvement.	5	5
8) I believe it would be acceptable to use this treatment with individuals who cannot choose treatments for themselves.	5	5
9) Overall, I have a positive reaction to this treatment.	5	5

These findings in the current study closely reflect LeBlanc et al.'s social validity results. Parents rated question 6 ("I believe my child experienced discomfort during the treatment") lower than all of the other questions, yet still gave the highest (*strongly*

agree) or second highest (*agree*) rating to every other question. It appears that parents are willing to continue a protocol that submits their child to a little discomfort if it means they will be taught an extremely important life skill as a result. The overall average social validity (averaged across items) was 4.8 where a rating of 5 was the highest attainable rating and 1 was the lowest. Overall, both parents found the treatment acceptable and would recommend it to others.

General Findings

Data from the baseline and treatment conditions for both Oscar and Colin are presented in Figures 2, 3 and 4. Figure 2 presents the nonconcurrent multiple baseline data for the number of successful in-toilet urinations and accidents for both boys. Note that accidents were not measured during baseline. However, accidents were an important part of the criteria for success so they were tracked during treatment. Figure 3 presents the percent of successful urinations as a function of sessions for both boys as a means of direct comparison between the participants. Figure 4 presents the nonconcurrent multiple baseline data for the percent of self-initiations (# of self-initiations ÷ # of total urinations) per session for each boy. Please note that scheduled sits were still occurring during the treatment phase. For this reason, the percentage of self-initiations during the treatment phase may be skewed. The children were required to sit on the toilet during their regularly scheduled sits. If they happened to urinate in the toilet, this was recorded as a success, but no self-initiation. In other words, a low percentage of self-initiations did not necessarily infer that successful in-toilet urinations did not occur.

Oscar

Level Analysis

Results show that Oscar reached the final success criteria after only eight days. During baseline, Oscar was not initiating, nor was he urinating in the toilet. Upon the first day of training, Oscar had 100% success with urinating on the toilet and self-initiated nine times. From Day 2 through Day 8, Oscar continued to have 100% urinations on the toilet, with the exception of Day 4 when the urine alarm was removed. He also continued to self-initiate with the number of initiations ranging from nine on the first day to five on the last day. Accidents remained at zero during the entire training, with the exception of Day 4. On this day, accidents occurred during 20% of his toileting incidences. At follow-up, Oscar was still self-initiating 100% of the time, and had 100% success with urinating in the toilet and had zero accidents during waking hours. Oscar's follow-up data remained extremely stable: the absolute number of in-toilet urinations per day, the percent of successful urinations, and initiations all remained consistent over the next 13 days. There were no accidents and each of his in-toilet urinations was self-initiated.

Variability Analysis

The variability in Oscar's toileting was unchanged throughout the entire three days of baseline data collection, as seen in Figure 2. Oscar's variability during the toilet-training phase ranged from 16 successful urinations in the toilet immediately after training to as few as three successful urinations in the toilet over the next eight days. Accidents changed accordingly. It is important to note that the variability noted in Figure 2 reflects the absolute number of urinations per day, not successful urinations. As we

moved from training in which liquids were encouraged to a more normal daily drinking pattern, Oscar's urination rate (urinations per day) declined. Note, however, that his percent of successful urinations and initiations (Figures 3 & 4) remained relatively high and stable. During the last four days of treatment, the absolute number of urinations per day stabilized with a total variability range difference of only two per day. Given Oscar's percent success, combined with his stabilized daily urination pattern and stable initiations, it was safe to assume that the last four days of data collection provided a clear representation of Oscar's toileting behavior.

Trend Analysis

Oscar's in-toilet urinations were flat and at zero during baseline. With exception of Day 4, his treatment rate of toileting success jumped to 100% and remained flat throughout treatment and follow-up. Initiations were at zero during baseline. They increased and remained high on the first day of treatment. However, once the primary investigator left and turned the treatment over the mother, initiations dropped and gradually recovered over the next four days. By the end of treatment, as well as at follow-up, initiations were high and stable with no detectable trend.

Colin

Level Analysis

Results showed that Colin reached final success criteria after 11 days. During baseline, Colin had zero successful urinations and was not initiating toilet use. Upon the first day of training, Colin had four successful urinations and nine accidents. He did not self-initiate toilet use the first day. Successes from Day 2 through Day 11 ranged from

46% to 100% of all toileting incidences. Colin demonstrated 3 days of 100% success with urinations in the toilet until reaching final success criteria, with the exception of Day 10 when the urine alarm was removed. Accidents were occurring 69% of the time during the initial day of training and continued to decrease to 0%. The only exception was on Day 10 when the urine alarm was removed. On this day, accidents increased to 17%. Throughout the entire 11 days, Colin's number of self-initiations ranged from zero to one. Upon follow-up, Colin was still at 100% success with urinations, and self-initiations remained at one.

Variability Analysis

There was no variability in Colin's data during baseline. Throughout the entire baseline phase, in-toilet urinations remained at zero. During the treatment phase, results showed that Colin's successful urinations in the toilet ranged from six in-toilet urinations daily to as few as two in-toilet urinations over the next 11 days. His accidents changed accordingly (See Figure 2). In the beginning of the treatment phase (Days 1-5), Colin showed increased signs of variability as he began using the toilet; sometimes he was successful, sometimes he was not. The final portion of the treatment phase (Days 6-10) showed no variability in the total number of absolute urinations per day (See figure 2). Recall that his success rate at this time was nearly 100%. Colin exhibited four days at 100% success throughout the final five-day period. The only sign of variability occurred during on Day 10 when Colin had one accident. However, while his percent of successful urinations remained relatively high, his initiations remained low but stable (Figures 3 &

4). This leads one to assume that the treatment resulted in moderate control over Colin's in-toilet urination behavior but not in the reliable establishment of self-initiations.

Trend Analysis

The trend for Colin's in-toilet urinations during baseline did not change and remained at zero. There was no increasing or decreasing trend. During the treatment phase, Colin's data reflected an increasing trend due to the gradual increase in his number of successful in-toilet urinations. During the last five days of treatment, the trend leveled out and showed no signs of systematically increasing or decreasing. Follow-up results showed a continued high, stable trend, much like the last five days of the intervention phase.

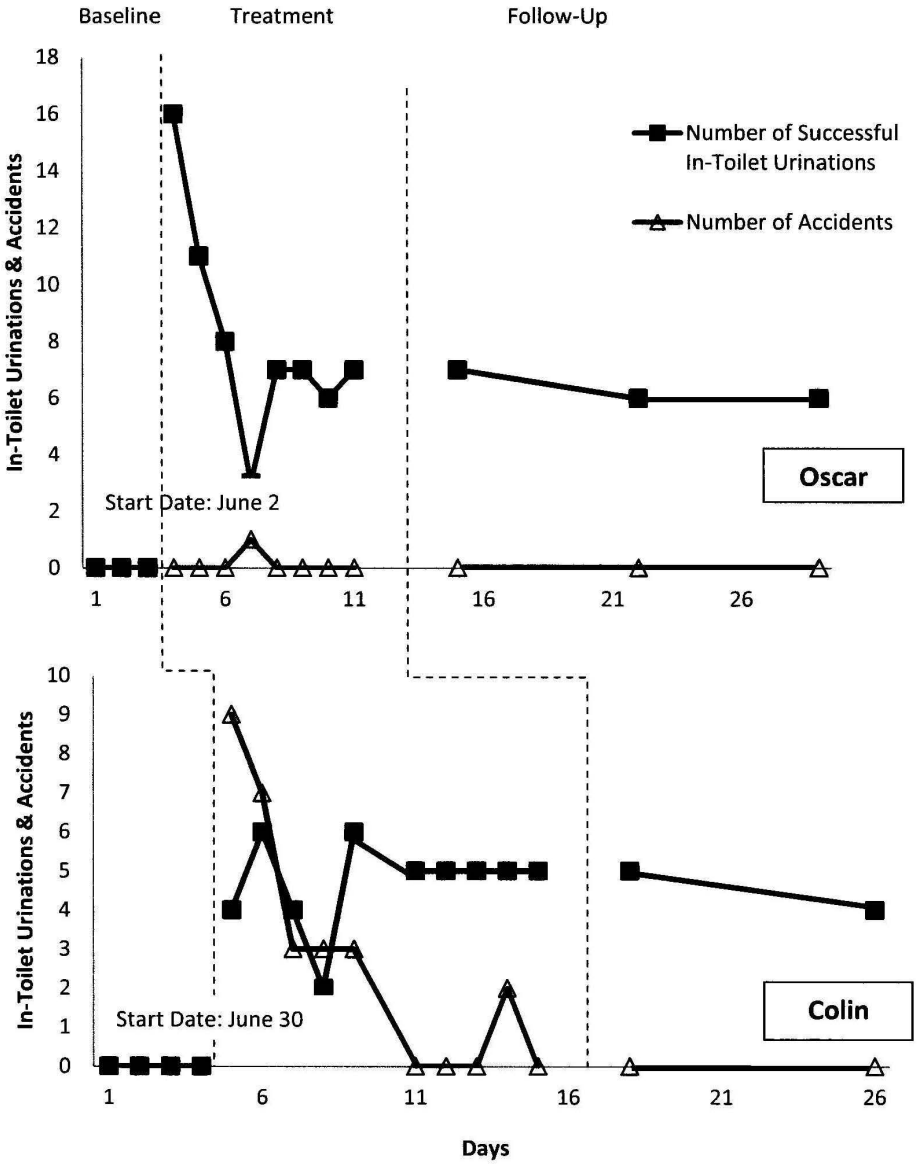

Figure 2. Nonconcurrent multiple baseline across participants plotting absolute number of in-toilet urinations and accidents. Notice the differential start dates.

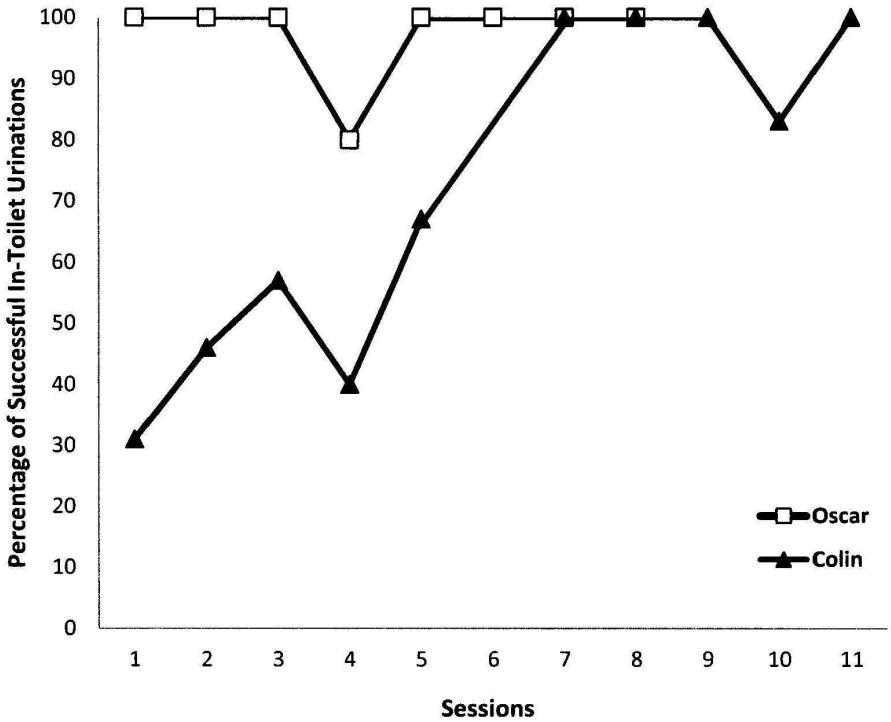

Figure 3. The percent of successful in-toilet urinations throughout training for both participants.

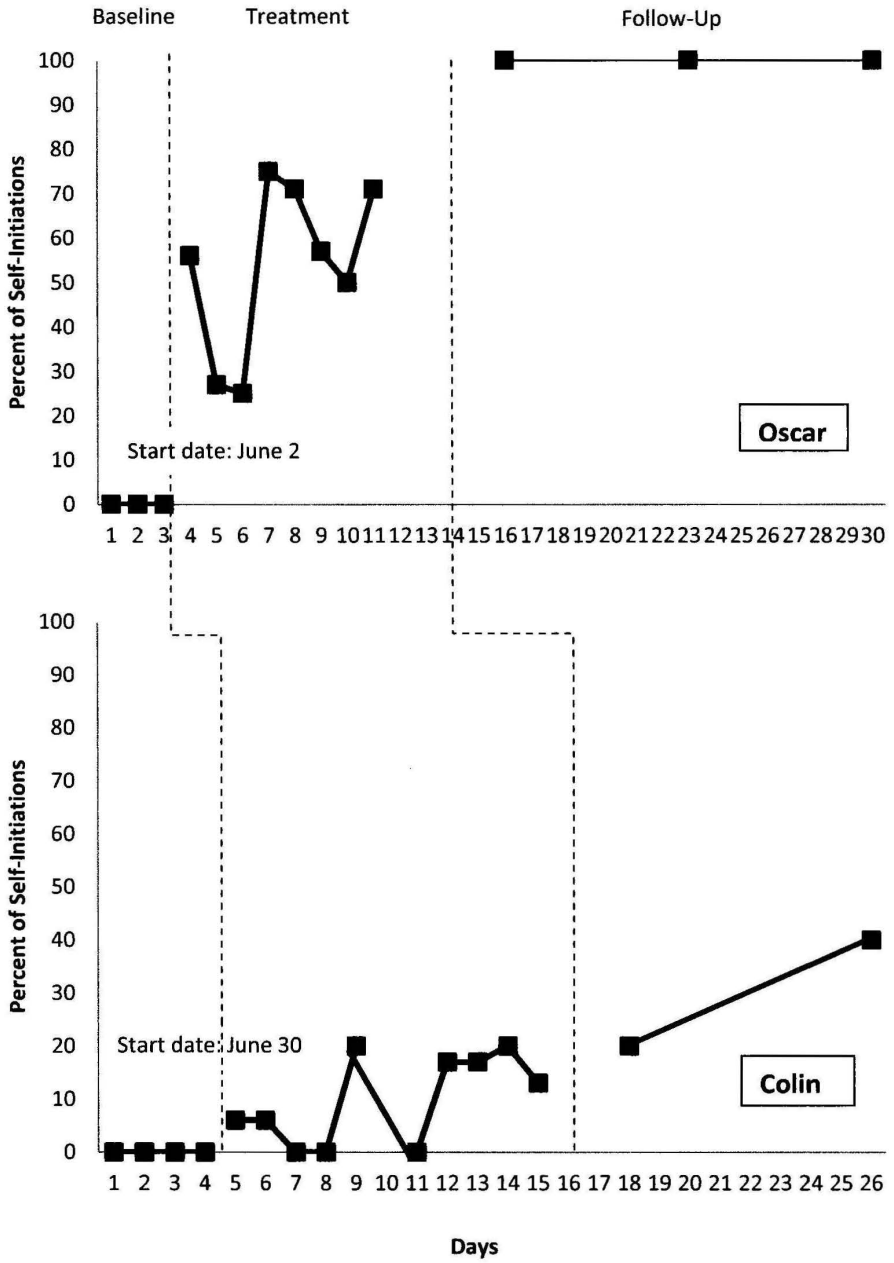

Figure 4. A nonconcurrent multiple baseline across participants indicating the percent of self-initiations. Notice the differential start dates.

CHAPTER V

DISCUSSION

The results of the punishment-free, toilet-training protocol showed the intervention to be effective for the two male participants who were previously incontinent. Both boys showed impressive improvement in toileting skills with increases in the percent of successful in-toilet urinations, decreases in the number of accidents, and increases in self-initiations, all within a short timeframe. Historically, the use of applied behavior analytic techniques to teach toileting skills began with Ellis (1963) and Azrin and Foxx (1971), but these early methods included various punitive consequences, including restitutional overcorrection, positive practice, and verbal reprimands. Over the past forty years, behavioral toilet-training practices have come under scrutiny for their reliance on punishment (Kroeger & Sorensen-Burnworth, 2009).

As a result, the techniques have undergone refinement, and clear attempts have been made to reduce the use of punishment-based contingencies as part of the intervention. LeBlanc et al. (2005) eliminated the use of restitutional overcorrection commonly used in previous toilet-training methods, but continued to include positive practice and verbal reprimands. Results from her work indicated that the behaviorally based protocol without the overcorrection component was successful in teaching three children with developmental disabilities the necessary toileting skills to self-initiate urination in the toilet.

Results from the current study are generally similar to those of LeBlanc et al. (2005). However, the protocol was quite different. The primary purpose of the current

study was to eliminate the use of those explicit punishment-based procedures that were retained in the LeBlanc et al. study–namely positive practice and verbal reprimands–and to determine the impact on toilet-training success. As such, it appears that those specific punishment components may not be critical to the success of a toilet-training protocol. The participants in this study met final success criteria more rapidly than the participants in LeBlanc et al. Oscar and Colin met the criteria for success in 8 and 11 days, respectively; LeBlanc et al.'s participants achieved success within 10-30 days.

The overwhelming success of the current study suggests that toilet training for children with developmental disabilities may be possible without reliance on procedures that have long been considered crucial to success. Only replications will reveal the overall generalizability of these results, but the likelihood of other participants benefiting from the protocol used in this study appears quite high. This is an area ripe for replications in which other children with PDD-NOS and autism, as well as other developmental disabilities, should be exposed to the protocol developed for this study and their results with the toilet training should be assessed.

When viewed overall, the pattern of toileting skill acquisition for both boys was generally similar. Both boys were completely incontinent at baseline. Within a reasonably short period of time (within 2 weeks), both boys had met all criteria for success (2 days with 80%+ in-toilet urinations without the urine alarm). The change in level between baseline and the treatment phase was striking. Both boys were regularly 100% successful for entire days over the last week of training. In both cases, parent satisfaction was high. The robust nature of the acquisition of toileting skills in both boys

(each with differential diagnoses) in the nonconcurrent multiple baseline design suggests a highly viable treatment alternative despite the removal of positive practice and verbal reprimands.

Oscar

Oscar's response to training was remarkable. He never experienced the urine alarm sounding during training, and his self-initiations appeared within the first 45 minutes (after only five scheduled sits). He even self-initiated prior to defecating in the toilet on Day 1. His only accidental (non-toilet) urination occurred the morning of the removal of the urine alarm. It is likely that the alarm device may have served a discriminative function for Oscar. In its absence, stimulus control was lost and the accident occurred. However, he never had another accident, so transfer of stimulus control to the contingencies of the natural physiological sensations was likely occurring throughout the training such that he could transition so quickly after the urine alarm was removed. His success suggests that some children (even moderately to severely affected children with developmental disabilities) may be able to toilet train–without traditional punitive methods–rapidly and virtually without errors/accidents. However, as evidenced by the more gradual success of Colin, it is clear that some children with disabilities may take longer than Oscar. Still, it is clear from the current study that even slower learners may be successfully toilet trained without punishment-based techniques.

Colin

Colin met the success criteria within 11 days. He went from completely incontinent to nearly 100% success in less than 2 weeks. However, Colin's progress was

slower and more gradual than Oscar's. His increase in successful urinations was gradual in nature, and he took longer in duration to reach the final success criteria. Unlike Oscar, Colin's number of accidents far surpassed his number of successes (69% and 31%, respectively) on the first day of training. Although his success rate was low initially, he continued to improve each day thereafter and ended the treatment with 4 days at 100% success. Colin's results reflect more of an expected outcome of treatment implementation. It is clear from Colin's data that he required some time to learn the behavioral contingencies at work during the toilet training. Each day he improved by small increments before stabilizing at 100% successful urinations in the toilet. However, Colin's results differed when self-initiations were examined. He did not increase his self-initiations above one per day throughout the entire treatment phase. He began the treatment with zero self-initiations and ended the treatment with only one self-initiation. This does not reflect a compelling change in his ability to self-initiate his toileting needs. Although the final success criteria were reached, this highlights one of the many limitations to the study.

Limitations

Individual Differences

As with all single-subject research, participants' individual characteristics and environments may be a major contributing factor to behavior change. A few worthy characteristics that may have accounted for treatment outcomes should be discussed.

Differential Diagnoses

Diagnostic characteristics may have led to differences in findings for each participant. Oscar was diagnosed with PDD-NOS that is considered to be a "lesser" form of autism under the autism spectrum disorder (ASD) umbrella. Colin seemed to be more severely affected by the characteristics of ASD than Oscar and struggled more with the self-initiation aspect of the toilet-training protocol. As such, Colin's more severe communication deficits may have made the toilet training more difficult for him.

Age Differences

Age may have played a factor in Oscar's ability to toilet faster and to have more success with self-initiations. At the time of the study, Oscar was 5-years old and Colin had just turned 4-years old. Even for normally developing children, 1 year of development can lead to much more sophisticated physical, mental, and verbal skills. Toileting acquisition skills in the current study may have been influenced by maturity level differences.

Differential Communication Skills

Oscar exhibited self-initiation skills very early in the training and continued to maintain high rates of self-initiated toileting whereas Colin did not. This may have been due to very different foundational communication skills. Oscar was verbal and had about 10-12 spoken words. At school, he communicated primarily via PECS and ASL, in addition to minimal vocal language. Oscar was receiving limited pre-school based intervention based on a total communication approach (no assistive communication devices). During the intensive training day, Oscar was able to vocally imitate the primary

investigator and began manding for crackers and juice (words that were not previously in his repertoire).

Colin, however, only had about five to six words; his pre-school was using ASL with some vocal language spoken to him (no PECS, no assistive communication devices). Colin had very limited manding skill in general. Nearly all of his communication was limited to tacting. During the intensive training day, it was difficult to get Colin to vocally imitate. These differences in communication skills were likely the reason why Oscar had success with initiations while Colin was still performing poorly. This would suggest that manding ability may serve as a good selection criterion for learning self-initiations, which are often viewed as a critical component for functional independence where toileting is concerned.

Parental Characteristics

Both participants in this study had parents that were extremely concerned with their child's lack of toileting skills. Both were "fulltime" mothers, and both had family support systems while they were carrying out the remaining days of toilet training. In addition, it seemed that the participants' home environments were enriching and filled with many opportunities for praise-based reinforcement. Both parents had a strong desire and high motivation to have their child toilet trained. Due to the high amount of required parent implementation of the protocol, these parental differences should be considered when assessing the study's outcome. LeBlanc and colleagues (2005) failed to provide this type of information in their study so a direct comparison is not possible.

Ongoing Parental Support

Oscar's self-initiation data did drop rather rapidly on Day 2 and Day 3 as compared to Day 1 (going from nine self- initiations to three self-initiations to two self-initiations, respectively), but this was likely due to a lack of parental attention. In a brief phone conversation, the primary investigator suggested that the parent monitor the child a bit more closely to look for the signs of initiation. After this, Oscar's self-initiations began to increase.

Colin's results were missing one data point due to the parent failing to gather data that day. Perhaps more frequent contact with the primary investigator would allow the researcher to provide more parental support, to answer questions, and to encourage regular and reliable data collection. Taken together, this contact might reduce such lapses in the data.

Criteria for Success

The final criteria-for-success were set prior to the beginning of training based on previously established criteria (LeBlanc et al., 2005). As stated previously, final success criteria for this study were categorized by two consecutive days at Level 12 with no urine alarm, and with 80% in-toilet urinations. A criterion for self-initiations was not set. Although both participants met the established criteria for success, the two children differed in their rates of self-initiations in the present study. Oscar showed high amounts of initiations on the first day of training and continued to exhibit high amounts through follow-up. Colin, however, did not. Instead, he began initiating on Day 2 but only at very low rates and continued to exhibit low rates (ranging from zero to one per day). Although

Colin met the criteria for success according to the study's established criteria, one could argue that full and functional continence has not yet been achieved because he is not self-initiating toilet use frequently.

Colin's mother reported that she believed Colin was holding his urine until his scheduled sit time. Although he was not self-initiating using ASL, PECS or words, she did report that he began showing signs of needing to urinate (e.g., squirming, holding his pants, etc.) around the time of his next scheduled sit. Colin's accidents did decrease, perhaps because he learned to hold his urine. One could argue that Colin was showing signs of learning to wait for the next scheduled sit but his self-initiation rate suffered from his inability to mand. In hindsight, more prerequisite work on manding might have improved his results. Future replications of this study may need to adjust the success criteria to better suit the functional aspects of the toilet training. Including self-initiations—for example, the percent of in-toilet urinations that are self initiated—among the criteria may slow success for those who have communication deficits but doing so could ensure greater independence.

Urine Alarm Issues

Another interesting consideration revolves around the urine alarm. Both participants showed a decrease in their number of successful urinations on the toilet and an increase in their number of accidents on the day that the urine alarm was removed. A couple things may be responsible for this finding. First, it could have been that the urine alarm served as stimulus control for the behaviors of initiations and/or for successful in-toilet urinations. Put differently, the participants' successful urination on the toilet or

potty chair may have been under the control of the presence of the urine alarm device in their underpants. Note that for Oscar, the alarm never sounded. When the urine alarm was removed, the discriminative stimulus was no longer present, resulting in an accident. It is likely that multiple stimuli were involved in this stimulus control including the presence of the urine alarm device (visual/tactile), the time to the next scheduled sit, and the urge to urinate. Although the presence of the urine alarm device may have been the most salient feature, once removed, a single accident may have been sufficient for the other cues to acquire stimulus control.

Normally, when a participant urinated in his pants, the alarm sounded. Colin did experience the urine alarm several times on at least five days. As a result, his behavior may have been operating under an avoidance contingency. Although the alarm sound was tested prior to the training and both parents had given their consent to submit their children to the sound, it could have been that the alarm sound was annoying to Colin. As a result, he may have quickly learned that he could avoid the alarm sound by urinating on the potty-chair, rather than in his underwear. Once the urine alarm was removed and the discriminative stimulus was no longer present, the subsequent accident may have occurred due to the loss of aversive stimulus control.

The different results suggest that the use of urine alarms does not necessarily constitute punishment. For Oscar, it may have signaled the availability of reinforcement; for Colin, it may have signaled an increased probability of punishment. It should be noted that although the current treatment was originally intended to employ a completely punishment-free toilet-training method, in some cases, the use of a urine alarm may

constitute a form of punishment for some children. However, the success with Oscar (who never experienced the alarm sounding) suggests that these techniques may be viable without the use of the urine alarm altogether with some children.

Both children offered evidence consistent with a stimulus control by other environmental features, but the current interpretations are speculative. Further investigation into the elimination of the use of urine alarms and/or their stimulus control properties is clearly warranted.

Recommendations for Future Research

Future research is needed to determine the role that punishment plays in contributing to the success of a behaviorally based toilet-training protocol. This protocol adapted LeBlanc and colleagues' (2005) study by omitting the aversive positive practice and verbal reprimand contingencies that were included their protocol. Results from this study showed that a behaviorally based protocol does not necessarily require the use of positive practice and verbal reprimands to produce meaningful change in toileting behavior. Additional replications and extensions of the current study are needed to determine whether punishment is a necessary aspect of a behaviorally based, toilet-training protocol or not. Further research should also examine the protocol's effects on children with other developmental disabilities to determine if it is an appropriate treatment for incontinence. Many of the studies discussed in this literature review involved children with autism and related disorders. An evaluation of the protocol with other diagnoses (e.g., mental retardation, Down syndrome, Williams syndrome, Fragile X

syndrome, Prader-Willi syndrome, etc.) should be performed to further test the generalizability and use of this toilet-training method.

Additionally, carry-over effects in nighttime continence should be researched to determine if there are any residual effects of the daytime specific protocol that this study employed. Anecdotally, one parent reported that their son began waking up with a dry pull-up just three days into training. Some could argue that daytime continence results in nighttime continence. It would seem logical to assume nighttime continence may follow once stimulus control by urination urgency develops. Also, it would be interesting to examine the effects on other self-help skills and independence as a result of children becoming continent. This protocol not only taught toileting; it also taught other self-help skills including hand washing, pulling up and down pants, and initiating functional communication. It may be that learning to toilet appropriately leads to further expansion and desire to become independent with other daily living activities. Perhaps as a result of incorporating toileting skills into a child's behavioral repertoire, it expands their ability to perform other self-help based skills, especially with those involving fine and gross motor. Last, it may be interesting to collect and examine data on the number of redirections that occurred during training while the child was on the toilet or potty-chair. The number of redirections could be an indicator of the lack of reinforcement in the environment. For example, the more redirections that occurred, the less likely the child was enjoying their time on the toilet that could lead to reduced success. Since this protocol relies heavily upon reinforcement, it would be an important factor in making sure that the number of redirections decreased as soon as possible on Day 1 of the training.

Expansion of this study is required to further the field's understanding of less punitive, behavioral toilet-training methods and their effects on various populations. Behaviorally based toilet training has a long history dating back to the early 1960s with Ellis (1963) and the 1970s with Azrin and Foxx (1971). Since then, the protocols have been adapted to be less aversive and have continued to lead to positive behavioral change. Appropriate toileting is a skill that all human beings need to live healthy, fulfilling, and independent lives. The current findings have the potential to further transform toilet-training practices and to support an additional shift away from the use of punishment in modern toilet training.

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APPENDIXES

APPENDIX A

RECRUITMENT ADVERTISEMENT

Please note: Images and a phone number were redacted from this page due to copyright and privacy concerns.

APPENDIX B

PRELIMINARY SCREENING QUESTIONNAIRE

Central Washington University
Screening Questionnaire

ABA Trainer: CHELSEA PEARSALL
Affiliation: CWU Psychology Department
Phone:
Thesis Supervisor: WENDY A. WILLIAMS
Phone:

INTAKE SCREENING

Parent Name: _____

Address: _____

Phone: _____

Child's Name: _____ Child's Age: _____

Child's Diagnosis/When diagnosed: _____

Does your child suffer from seizures or have a past history of seizures? □ YES □ NO
If yes to the above question, exclude and offer referral to BAT Team, offer parent packet.

Does your home have a bathroom with a flush toilet? □ YES □ NO
If no to the above question, exclude and offer referral to BAT Team, offer parent packet.

Are you aware of any medical conditions that would prevent your child from being able to toilet train?

□ Bladder muscle spasms
□ Dehydration
□ A Catheter
□ Diabetes
□ Spinal Cord Damage or Trauma
□ Urinary Tract Infection
□ Other: _____

If yes to the above question, exclude and offer referral to BAT Team, offer parent packet.

Please note: phone numbers were redacted from this page due to privacy concerns.

APPENDIX B (CONTINUED)

BASIC ADAPTIVE SKILLS

1. Can your child walk?

2. Does your child use language, or ASL, or picture exchange to communicate? Explain.

TOILET TRAINING HISTORY AND SKILLS

1. Does your child have any auditory sensory issues? If so, describe some common triggers and the severity.

2. Toilet training is time intensive. Are you (and your spouse, if applicable) willing to spend an entire weekend working with your child to develop these skills?

3. Have you previously attempted toilet training in the past? If so, what have you done?

4. Does your child notice wet pants or diapers? If so, do they tell you? How?

5. Can your child pull down his/her pants independently?

6. Can your child get up onto the toilet independently? Get onto the potty chair independently? Describe.

7. Can your child sit on the toilet or potty chair independently? What does your child do while sitting on the potty?

8. Can your child pull up his/her pants independently? Can your child flush the potty independently?

9. Is your child currently urinating on the toilet? Please describe.

10. Is your child currently requesting to use the toilet? Please describe.

Additional comments or concerns:

APPENDIX B (CONTINUED)

INCLUSION/EXCLUSION CRITERIA

PARENT NAME: _____

CHILD'S NAME: _____

1. Age (4-9 yrs) ☐ YES ☐ NO, Exclude

2. Flush toilet in the home ☐ YES ☐ NO, Exclude

3. Walking ☐ YES ☐ NO, Exclude

4. Language ☐ Vocal ☐ ASL ☐ PECS ☐ NO, Exclude

5. Developmental Disability ☐ YES ☐ NO, Exclude

6. Seizures ☐ YES, Exclude ☐ NO

AVAILABILITY

POSSIBLE DATES FOR TOILET TRAINING: _____

INITIAL INTERVIEW DATE: _____

INITIAL INTERVIEW COMPLETED: _____

POTT TRAINING SESSION SCHEDULED: _____

POTTY TRAINING SESSION COMPLETED: _____

FINAL COMMENTS:

APPENDIX C

TOILET-TRAINING PARENT PACKET

Toilet-Training Parent Packet

Please note : four images were redacted from this page due to copyright concerns.

APPENDIX C (CONTINUED)

Contact Information:

Chelsea Pearsall
Graduate Student, CWU
Phone:

Season Almason, MA
Board Certified Behavior Analyst
Phone:

Wendy Williams, PhD
Thesis Chair, CWU
Phone:

Please note: Phone numbers were redacted from this page due to privacy concerns.

APPENDIX C (CONTINUED)

Punishment-Free Toilet-Training for Children with Developmental Disabilities

Dear Parent(s),

Thank you for your interest and participation in this toilet-training study! It is my hope that we can work together to teach your child how to toilet train and to do so in a manner that is relatively quick and easy.

This packet is designed to help you continue the toilet training after I leave your house. I have included a few handouts to help you with sit schedules and with the rules for removing the urine alarm. Feel free to post these on your fridge, in your bathroom, etc. to serve as a reminder.

I am available by phone anytime that you have a question. If I do not answer, please leave a message and I will get back to you as soon as I can. If it is not urgent, and you prefer to email, my address is:

I am very excited to begin this toilet training and I look forward to tracking your child's progress!

Sincerely,
Chelsea Pearsall

Please note: An email address was redacted from this page due to privacy concerns.

APPENDIX C (CONTINUED)

Toilet-Training Protocol

Materials: Urine alarm, stop watch, cleaning supplies, hand soap, PECS cards (if applicable), your child's preferred beverages, foods, and toys, your child's preferred DVDs (a laptop will be provided during Day 1 training), and a stepstool.

Training Components: Drinking schedule, scheduled sits, communication training, differential reinforcement of urination in toilet, alarm training

Drinking Schedule- Beginning at every 5 minutes of the first day and gradually fading to every half hour, offer your child a preferred beverage. *Note: only on the first intensive day

Sitting Schedule- 5 minute sits every ____minutes. It is **VERY** important that you know what schedule your child is on! The criteria for increasing the schedule is *80% accuracy for 2 days beginning on Day 4.*

Communication Training Schedule- Say the communication response (e.g., "potty") and have your child say the communication response vocally or with sign and/or give you the PECS card at EVERY SCHEDULED SIT (prompt these responses when needed).

Differential Reinforcement of Urination in Toilet- Upon your child's successful urination in the toilet:

Provide social praise that your child enjoys (e.g., enthusiastic verbal praise, hugs, claps)

Provide highly preferred toys and/or food

Allow your child to get off of the toilet and resume playing

APPENDIX C (CONTINUED)

URINE ALARM

If the alarm sounds:

1. IMMEDIATELY AND PROMPTLY lead your child to the toilet and say the communication response ("potty")
2. Assist your child onto the toilet and allow him/her to complete urinating if needed.
3. Remove the sensor to stop the alarm from sounding
4. If your child urinates on the toilet, provide reinforcement and remove them from the toilet
5. If your child *does not* urinate within 1 minute of being placed on the toilet, remove them from the toilet.
6. Change any soiled clothing, sanitize the area/alarm, and clean and replace dry alarm and sensor in your child's clean underwear
7. **Resume sit schedule immediately!!**

APPENDIX C (CONTINUED)

Schedule Change Criteria

Day 1:

- Increase off-toilet time each hour (see schedule below) unless there are no successes by noon. If this is the case, hold the schedule at 5 minute sits and 15 minutes off for one more hour.
- Use the last attained schedule for the evening after 6 pm (e.g., at 6pm, your child is on the schedule of 5 minute sits and 45 minutes off. Use this until their bedtime).
- Drink schedule: offer preferred drinks to your child:
    - Hour 1- every 5 minutes
    - Hour 2- every 10 minutes
    - Hour 3- every 15 minutes
    - Hour 4 until 6pm- every 30 minutes

Day 2:

- From the time your child wakes up until 2 pm, keep the same schedule as the previous evening
- At 2 pm, increase the time to the next level if your child has had at least 2 successes since waking. If not, keep your child at the current level until 2 successes occur.

Day 3:

- If your child had at least 2 successes between 2 pm and bedtime on the previous day, start the day at the next level (e.g., if your child was at 5 minutes on, 45 minutes off and they had 2 successes after 2pm, increase their schedule to 5 minutes on, 60 minutes off at the start of this day)
- If they did not have 2 successes between 2 pm and bedtime on the previous day, keep the morning schedule the same as the previous evening's schedule.
- At 2 pm, increase the time to the next level if your child has had at least 2 successes since waking

Day 4 through follow up:

- The new criterion to increase the scheduled sit is 80% success at both home and school/daycare for two consecutive days. Please use the formula below to

APPENDIX C (CONTINUED)

determine if your child is having at least 80% success. Simply count the number of successes (in-toilet urinations) and divide them by successes plus accidents. This will yield a percentage. Please make sure you do this for two consecutive days before increasing the schedule. Don't hesitate to call Chelsea with any questions regarding this formula.

- Success Formula: $\frac{\text{Successes}}{(\text{Successes} + \text{Accidents})}$

APPENDIX C (CONTINUED)

Levels of Toileting Sits

1. 10 min. sit - 5 min. off
2. 10 min. sit - 10 min. off
3. 5 min. sit - 15 min. off
4. 5 min. sit - 25 min. off
5. 5 min. sit - 35 min. off
6. 5 min. sit - 45 min. off
7. 5 min. sit - 60 min. off
8. 5 min. sit - 1 ½ hours off
9. 5 min. sit - 2 hours off
10. 5 min. sit - 2 ½ hours off
11. 5 min. sit - 3 hours off
12. 5 min. sit - 4 hours off
13. No sitting schedule in place (your child should be initiating if he/she needs to use the toilet)

APPENDIX C (CONTINUED)

Note to Daycare, Preschool, etc.

Dear _____,

We have been working on toilet training and would like your help in continuing our efforts.

My child is on the following schedule today:

_____

Here are some helpful reminders:

- Every time you take my child to the bathroom, please make sure that you have my child communicate in the following way:_____
- When my child has a successful urination in the toilet, or starts to have an accident but successfully finishes voiding in the toilet, please don't forget to give my child:_____
- Other:

  _____

If you have any questions or concerns, please don't hesitate to call _____

Thank you so very much for your help with this important part of my child's life.

APPENDIX C (CONTINUED)

Reminders:

Praise your child EVERY time they urinate on the toilet!

Know your child's scheduled sit time

Do not reprimand your child for accidents

Place your child in a diaper during naps and at bedtime

Allow your child to get off the toilet quickly after every successful urination

Call Chelsea at with any questions

If you decide to inform your child's school or childcare about the protocol, please send your child with the directions for scheduled sits

Please note: A phone number was redacted from this page due to privacy concerns.

APPENDIX C (CONTINUED)

Toilet-Training **Preparation** Checklist

Prior to the all-day training, please:

□ Clean bathroom

□ Have hand soap and cleaning supplies for accidents

□ Have 10-15 clean and dry pairs of underwear

□ Have 3-5 clean pairs of shorts/pants

□ Determine how you will reinforce your child based on their preferences,

- Treats - M&M's, Skittles, fruit snacks, chocolate chips, etc.
  **Please do not offer your child these treats one week prior to the toilet training
- Small toys – Hot Wheels, baseball cards, etc.
  ** Remember, your child has the potential to acquire many of these in just one day, so plan accordingly

□ Have plenty of liquids that your child enjoys and will drink readily, e.g., apple juice, V8 fruit juice, Gatorade, Propel, etc. (Please no milk)

□ Have diapers for naps and bedtime

□ Plan to stay home all weekend, e.g., arrange for prior grocery shopping, running errands, etc.

APPENDIX D

INFORMED CONSENT

Parental Permission Form

Central Washington University

A Punishment-Free Toilet-Training Program for Children with Disabilities

Investigators: Chelsea Pearsall, Psychology Department Master's Student
Phone: Email:
Faculty Sponsor: Wendy Williams, PhD., Psychology Department
Phone: Email:

What you should know:

- We are scientists looking to improve your child's life by providing an alternative way to toilet train.
- You can allow your child to be in our study, or not.
- You can ask questions now, or later.
- You can decide about your child being in the study after your questions are answered.

Why is this research being done?

I want to know if punishment-free toilet training can teach your child to learn toileting skills. To do this, I want your help in working with your child in your home to teach them how to use the bathroom to urinate. I also want to know what you think about the toilet training. I hope that this research helps us to find better ways to toilet train children with disabilities.

What will happen if you give permission for your child to join this study?

I will go over the toilet training briefly to explain the process and how it will work. If you still want your child in the study, I will set up a time with you to come over and do the toilet training. Before the toilet training, you will take data on the amount of times your child urinates in the toilet and the amount of times they tell you before they do so. I will give you a data sheet to fill out and will make sure you do not have any questions on how to record the data. This baseline period will be anywhere from three days to 14 days, depending on your child's data. The all-day toilet-training will be a Saturday and will take about 6-7 hours. You can choose to start at either 9 a.m. or 10 a.m. During the training, you can watch what I do and then as the day progresses, you'll take over the training. If, at any time, you feel your child does not want to participate in the study, you can stop the training. You decide if your child wants to continue or not. We will also be collecting data on your child's toileting accidents and initiations. My professor and I will

Please note: Phone numbers and email addresses were redacted from this page due to privacy concerns.

APPENDIX D (CONTINUED)

be the only ones that see your child's data. Your child's name will not be attached to the data and once the study is completed, the data will be destroyed. During the time that I will not be in your home, you will be collecting the data for your child. You will record the data on the same sheet you used for baseline data collection. The toilet training could last up to 4 weeks.

Will your child benefit from joining this study?
Possibly. It is my hope that your child will be toilet trained by the end of the study. If they are not, we will still learn more about toilet training children with disabilities and begin to pinpoint why the training did not work.

Are there any risks or discomforts related to the study?
It is possible that your child will be inconvenienced during times that they are sitting on the toilet. However, we will make these times as fun as possible with activities that they can do while sitting on the toilet (i.e., singing, playing with toys, watching a DVD, etc).

There may be discomforts that are not yet known until the training begins. You will be watching your child for any signs of discomfort and can terminate the toilet training at any time you see fit.

What other things should you know?
You can choose to have your child be in this study, or not. If you give permission, I will rely on you to determine when/if your child does not want to participate in the study.

I will keep the information private. I will not use your child's name when I write my report.

Your participation is voluntary and so is your child's. Your refusal to participate or to continue participation will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time. Your child's termination in the study will also involve no penalty or loss of benefits to which they are otherwise entitled. They may end the study at any time.

Who should you contact if you have questions?
If you have questions about the study, call Chelsea Pearsall at or email . If you leave a phone message, please be sure to give your phone number so I can call you back.

If you are concerned about your rights or your child's rights as a participant in research, you may call the CWU Human Protections Administrator at .

Please note: A phone number and email address were redacted from this page due to privacy concerns.

APPENDIX D (CONTINUED)

What does it mean if you sign this paper?
Signing this form means you have been able to ask questions so that you understand what the study is about and you give permission for your child to be in it. You are not giving up any legal rights. You can ask more questions if you think of them later. You can change your mind later and stop the toilet training at any time without penalty.

_____

Parent Signature Date

APPENDIX E

TREATMENT INTEGRITY FORM

A Punishment-Free, Toilet-Training Protocol for Children with Developmental Disabilities

Treatment Fidelity Data (place a tally mark for every opportunity/each correct implementation)

Procedural Steps	Opportunities	Correct	% Correct
Urine Alarm Sounds			
1) Investigator uses ASL, PECS, or verbally says "Potty"			
2) Investigator brings child immediately to the bathroom and disables urine alarm.			
3) a) If child eliminates on toilet more than a few drops, investigator positively reinforces the child with praise and/or access to preferred items			
3) b) Investigator negatively reinforces child by assisting the child off of the toilet			
3) c) Investigator assists in attaching urine alarm and pulling up pants, if needed			
4) Investigator starts stop watch for next scheduled sit			
Scheduled-Sit Stopwatch Sounds			
1) Investigator uses ASL, PECS, or verbally says "Potty"			

APPENDIX E (CONTINUED)

2) Investigator brings child immediately to the bathroom and assists the child, if needed, with getting onto the toilet			
3) a) If child eliminates on toilet more than a few drops, investigator positively reinforces the child with praise and/or access to preferred items			
3) b) Investigator negatively reinforces child by assisting the child off of the toilet			
3) c) Investigator assists in attaching urine alarm, pulling up pants, washing hands, etc., if needed			
4) Investigator starts stop watch for next scheduled sit			
5) If scheduled sit time has elapsed without urination on toilet, investigator assists the child, if needed, off of the toilet.			
6) Investigator attaches urine alarm and assists in pulling up pants, washing hands, etc., if needed			
7) Investigator starts stop watch for next scheduled sit			

APPENDIX F

TREATMENT EVALUATION FORM

A Punishment-Free Toilet-Training Protocol for Children with Developmental Disabilities

Treatment Evaluation Form

**Please complete and return to Chelsea Pearsall within one month of the first toilet-training day. A self-addressed envelope is included if you wish to mail this form. All answers are anonymous, so please answer honestly.*

Read the statements below and circle the answer that most closely resembles your view as a parent or caregiver.

1) I find this treatment to be an acceptable way of dealing with my child's toilet training.

Strongly disagree Disagree Neutral Agree Strongly agree

2) If I were to do this over, I would still be willing to use this procedure to toilet train my child.

Strongly disagree Disagree Neutral Agree Strongly agree

3) I believe that it would be acceptable to use this treatment with other children.

Strongly disagree Disagree Neutral Agree Strongly agree

4) I like the procedures used to toilet train my child.

Strongly disagree Disagree Neutral Agree Strongly agree

5) I believe this treatment was effective.

Strongly disagree Disagree Neutral Agree Strongly agree

6) I believe my child experienced discomfort during the treatment.

Strongly disagree Disagree Neutral Agree Strongly agree

7) I believe this treatment is likely to result in permanent improvement.

Strongly disagree Disagree Neutral Agree Strongly agree

APPENDIX F (CONTINUED)

8) I believe it would be acceptable to use this treatment with individuals who cannot choose treatments for themselves.

Strongly disagree Disagree Neutral Agree Strongly agree

9) Overall, I have a positive reaction to this treatment.

Strongly disagree Disagree Neutral Agree Strongly agree